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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO
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EXAMINER

COLEMAN, WILLIAM D

ART UNIT PAPER NUMBER

2823

DATE MAILED: 05/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/934,154

Applicant(s)

TANIGAWA, KOUICHI

Examiner

W. David Coleman

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 24 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) 6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on 24 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 3 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Applicants admitted prior art **FIGS. 6A, 6B, 6C, 7A, 7B, 7C, 8A, 8B, 8C, 9A, 9B, 9C, 10 and 11**.

4. Pertaining to claim 1, Applicants admitted prior art teaches an improved process for producing a solid-state imaging device comprising the steps of: (see FIGS. 8A-8C and 9A-9C)
forming a light receiving portion **2** of a pixel in a region on the substrate surface **1**,
forming a convex lens **23** with an upwardly curved surface which is embedded in an inter-layer dielectric **9** above said light-receiving portion, and forming an on-chip lens **11** above said convex

Art Unit: 2823

lens, wherein said improvement comprises forming sequentially said light-receiving portion **2**, forming an inter-layer dielectric **22** having a depression in its surface above said light-receiving portion, forming on said inter-layer dielectric **22** a light transmitting film **23** having in its surface a concave conforming to said depression, forming at a position that covers said concave portion on said light transmitting film a mask layer **RP** with a convexly curved surface without etching or planarizing the light transmitting film (note as seen in figs. 7A-7C), and etching said mask layer and said light transmitting film all together, thereby making said light transmitting film into a lens **11**.

5. Pertaining to claim 2, Applicants admitted prior art teaches a process for producing a solid-state imaging device as defined in Claim 1, which further comprises, following the step of forming said light-receiving portion, the steps of forming electrodes **5** to transfer charges generated by said light-receiving portion, said

electrodes **5** being positioned above both sides of said light-receiving portion **2** and being insulated **4** from said substrate **1**, forming a shielding film **6** which covers the step of said charge transfer electrodes with an opening above said light-receiving portion, said shielding film being insulated from said charge transfer electrodes, and forming said inter-layer dielectric **22** covering said shielding film and its opening in such a way that said depression is formed in the surface of said inter-layer dielectric in conformity with the step of said charge transfer electrode and the step of said shielding film.

6. Pertaining to claim 3, Applicants admitted prior art teaches a process for producing a solid-state imaging device as defined in Claim 1, which further comprises, following the step of forming said light-receiving portion, the step of softening said inter-layer dielectric by heat

Art Unit: 2823

treatment, thereby adjusting a depth of said depression (i.e., re-flowing PSG film or BPSG film, see pp. 5 of Applicants disclosure) .

7. Pertaining to claim 5, Applicants admitted prior art teaches a process for producing a solid-state imaging device as defined in Claim 1, wherein the etching step is carried out under the condition that said mask layer and said light transmitting film have almost the same selectivity (see page 5 of Applicants disclosure, last paragraph).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art **FIGS. 6A, 6B, 6C, 7A, 7B, 7C, 8A, 8B, 8C, 9A, 9B, 9C, 10 and 11** as applied to claims 1, 2, 3 and 5 above, and further in view of Sano et al., U.S. Patent 5,796,154.

10. Applicants admitted prior art teaches a semiconductor process substantially as claimed as recited above. However, Applicants admitted prior art fails to teach a process for producing a solid-state imaging device as defined in Claim 1, which further comprises the steps of forming a resist pattern as said mask layer on said light transmitting film and softening said resist pattern by heat treatment, thereby adjusting the curvature of the surface of said resist pattern. Sano

Art Unit: 2823

teaches the steps of forming a resist pattern as said mask layer on said light transmitting film and softening said resist pattern by heat treatment, thereby adjusting the curvature of the surface of said resist pattern. See column 3, lines 23-49 where Sano teaches the limitation as claimed. In view of Sano, it would have been obvious to one of ordinary skill in the art to incorporate the process step of Sano into Applicants admitted prior art because it is preferable that the cross-sectional shape of the upper microlens is a convex shape whose central part is swelled either in the upward direction or downward direction (column 3, lines 54-57).

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

12. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

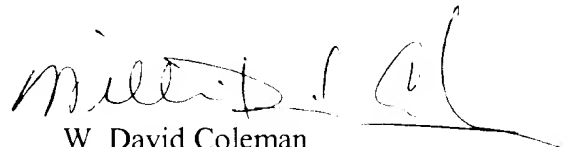
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 703-305-0004.

The examiner can normally be reached on 9:00 AM-5:00 PM.

Art Unit: 2823

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

A handwritten signature in black ink, appearing to read "W. David Coleman", with a long horizontal flourish extending to the right.

W. David Coleman
Primary Examiner
Art Unit 2823

WDC
May 26, 2003